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PLANETARY PHENOMENA FOR SEPTEMBER AND  
OCTOBER, 1906.

By MALCOLM McNEILL.

PHASES OF THE MOON, PACIFIC TIME.

Full Moon...	Sept. 2,	3 <sup>h</sup> 36 <sup>m</sup> P.M.	Full Moon.....	Oct. 2,	4 <sup>h</sup> 48 <sup>m</sup> A.M.
Last Quarter.	"	10, 12 54 P.M.	Last Quarter...	"	10, 7 39 A.M.
New Moon...	"	18, 4 33 A.M.	New Moon.....	"	17, 2 43 P.M.
First Quarter	"	24, 10 11 P.M.	First Quarter...	"	24, 5 50 A.M.
			Full Moon.....	"	31, 8 46 P.M.

The Sun crosses the equator from north to south and autumn begins September 23, about 3 P. M., Pacific time.

*Mercury* on September 1st is a morning star, rising a little more than an hour and one half before sunrise. It passed greatest west elongation ( $18^{\circ} 12'$ ) on September 29th, and soon begins to approach the Sun quite rapidly. It can be seen quite well for the first few days of the month, but the period of visibility is short. The greatest elongation is smaller than the average, as the planet passes its perihelion point on September 4th. *Mercury* reaches superior conjunction with the Sun on September 24th and becomes an evening star. This condition lasts until the end of November, but the planet's position south of the Sun makes the interval between the setting of the Sun and of the planet increase very slowly, and it will not be as great as one hour until after the end of October. A very close conjunction with *Mars* occurs on September 4th, while *Mercury* is in fine position for early-morning observation. The nearest approach of the planets is  $9'$ , less than one third of the diameter of the Moon, but both are below the horizon for all parts of the United States at this time. However, they will be seen quite close together on the mornings of September 4th and 5th.

*Venus* is an evening star, and throughout the two months sets rather less than two hours after sunset, the interval remaining almost constantly  $1^h 41^m$  until after the middle of October. It then begins to shorten, and by the end of the month is less than an hour and one half. *Venus* reaches its greatest east elongation from the Sun on September 20th, its distance then being  $46^{\circ} 29'$ . It passed its aphelion on September 17th, but the orbit of the planet is so nearly circular

that there is very little difference between greatest elongations, the varying distance of the Earth from the Sun at the times of greatest elongation having more influence than the position of the planet in its own orbit. The planet soon begins to approach the Sun quite rapidly, and by the end of October the distance is only  $36^\circ$ . *Venus* has now reached the part of its orbit where it is nearer to the Earth than to the Sun, and shows a crescent shape in the telescope. Its diminishing distance causes a great increase in brightness, and this lasts until the time when the planet is about halfway between greatest elongation and inferior conjunction. This occurs on October 25th. After that the narrowing of the crescent as the planet nears the Sun causes some diminution in brightness, although the distance keeps on diminishing until conjunction. The planet will be visible to the naked eye in full sunlight for a fortnight or so before and after the time of greatest brightness.

*Mars* is a morning star, rising a little more than an hour before sunrise on September 1st, and this interval increases about an hour each month, so that by the end of October it rises at about 3:30 A.M. It moves during the two months  $36^\circ$  eastward and  $14^\circ$  southward from *Leo* into *Virgo*. On September 9th it passes less than  $1^\circ$  north of the first-magnitude star *Regulus*,  $\alpha$  *Leonis*. *Mars* reaches its aphelion on October 17th. It will then be about one hundred and fifty-five millions of miles distant from the Sun, and about two hundred and twenty-six millions distant from the Earth, a gain of about twenty millions from the greatest distance; and there will be in consequence a gain of nearly twenty per cent in brightness, a perceptible increase, but it will still not be as bright as a first-magnitude star.

*Jupiter* rises a little after midnight on September 1st, and shortly before 9 P.M. on October 31st. It is in the constellation *Gemini* and moves about  $5^\circ$  eastward during the two months.

*Saturn* comes to opposition with the Sun and remains above the horizon during the entire night on September 4th. By the end of October it sets at about 3:30 A.M. It is in the extreme eastern part of *Aquarius*, and moves about  $3^\circ$  westward and southward during the two months. The apparent minor axis of the rings as seen in the telescope is about twice as great as it was during June.

*Uranus* is in the western sky in the evening. On September 1st it sets shortly after midnight, and on October 31st shortly after 8 P.M. Its motion is only about  $1^{\circ}$  during the two months, at first westward and then eastward, and it remains about  $2^{\circ}$  north of the third-magnitude star  $\lambda$  *Sagittarii*, the star in the end of the handle of "the milk-dipper."

*Neptune* rises at about 1 A.M. on September 1st, and at about 9 P.M. on October 31st. It is moving slowly eastward in the constellation *Gemini*.

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